LANSCE DIVISION RESEARCH REVIEW

Improvements Made to LANSCE's Accelerator Maintenance Request

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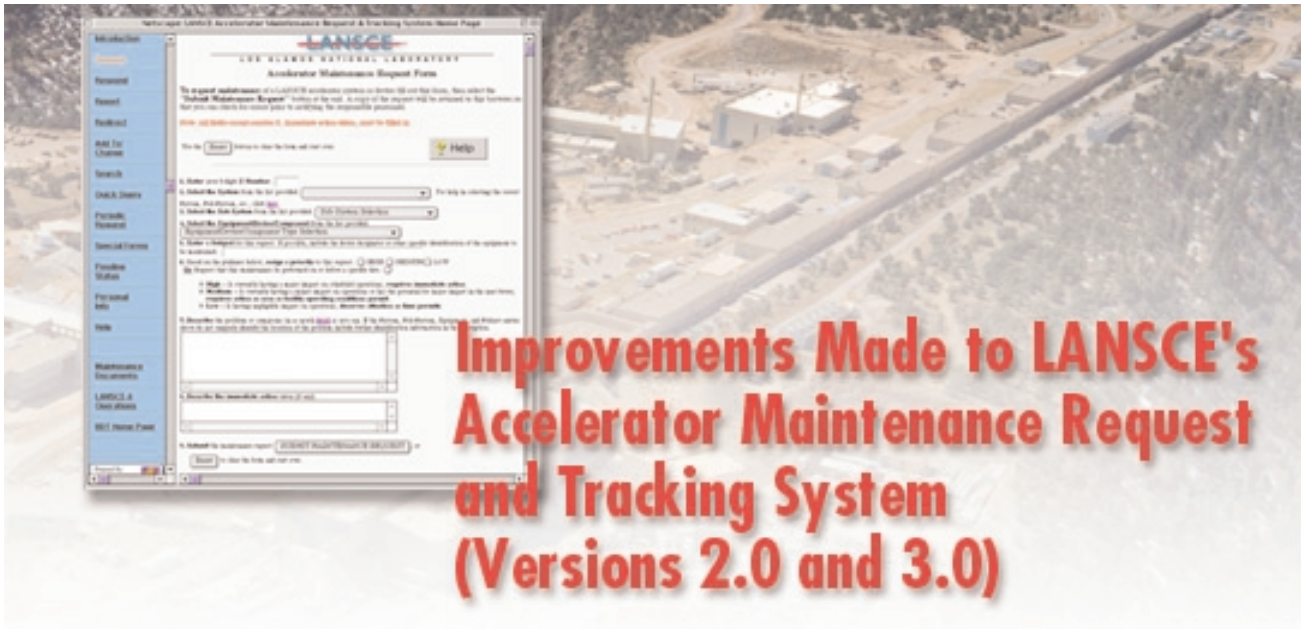


Introduction

LANSCE-6 has introduced a number of new features to its Web-interfaced database. These features have streamlined the user interface and improved its usability for requesting and recording maintenance on accelerator and beam delivery systems. First comissioned in 1997 as the Maintenance Request System, the upgraded LANSCE Accelerator Electronic Maintenance Request and Tracking System now provides a convenient way for acceler tor operators and others to notify staff and techncians responsible for system maintenance of needed equip- ment repairs and for maintenance pesonnel to record and report progress on those repairs. Not only are more maintenance personnel using the system on a regular basis but now managers can use the add- tional information that the database provides to understand their maintenance programs and to more efficiently prioritize the use of operating funds. The first major upgrade, Version 2.0, was introduced in October 1998.

System Capabilities

The Accelerator Maintenance Request and Tracking System now allows users to

- **su**bmit requests for maintenance of a LANSCE accelerator system or device, and either (1) assign a priority to the request, (2) request that the maintenance be completed by a specific date, or (3) request that maintenance be performed on a regular schedule;
- respond to maintenance requests with information about the work performed;
- submit reports of maintenance performed without a request;
- redirect maintenance requests that are initially sent to the wrong maintenance team;
- defer a request and provide the reason;
- update the status of pending maintenance requests;
- search the database to find maintenance records that meet flexible search criteria; and
- download records found to the user's desktop computer.

First Major Upgrade (Version 2.0)
New features introduced in Version 2.0 of the Accelerator Electronic Maintenance Request and Tracking System included the following:

One form to request and one form to report. Users requesting or reporting maintenance no longer have to submit multiple forms with information.

Request redirection. This feature allows the initial recipients of a maintenance request to redirect the request to another team either because the original request was sent to the wrong maintenance team or because the notified team diagnosed the problem as being within another team's area of responsibility. This feature also allows two or more teams to work serially to completely resolve a problem: the first team can describe what they did to complete their portion of the work and then they can redirect the request with that information to the second team for action.

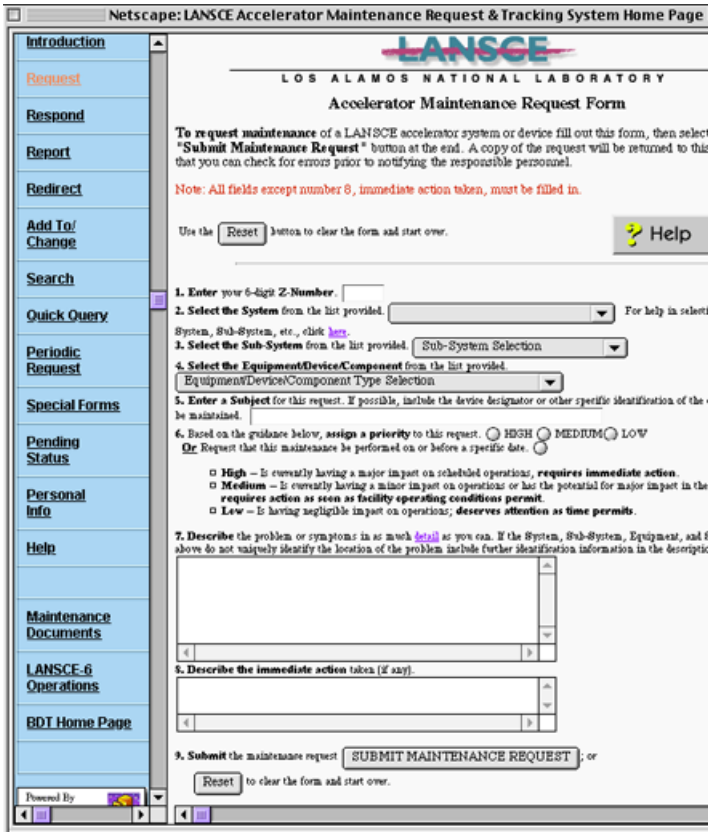
Quick queries. This feature allows users to get commonly needed information without filling out a complicated search form.

Enhanced equipment categorization. The new database contains a third level of equipment categorization (hierarchy) for tracking maintenance problems and establishing trends for problems areas. Whereas the previous database categorized problems only by system and geographic location, the new database categorizes problems by system, sub-system, and equipment/device/component type. This categorization allows maintenance teams and managers to more easily track maintenance events by equipment type; this information is becoming more important as the facility ages.

New fields for recording information about maintenance. New fields were added to the database to include the following: (1) information about the duration and effort required for each task, (2) the type of maintenance performed (corrective, preventive, adjustment or reset, calibration, or software upgrade), and (3) the most likely cause of the maintenance problem. Reports based on these fields will be especially useful to managers as they determine how effective their maintenance programs are and where limited funding should be spent.

On-line help. Help buttons and links were added to each of the forms to give system users a help file in a separate browser window. The help file contains step-by-step guidance on how to answer the questions on each on-line form.

Second Major Upgrade (Version 3.0)
Based on users' comments and on our observations about how the system was being used, we introduced a second major upgrade in April 1999. New features introduced in Version 3.0 included the following:



▲ ***Fig. 1.*** *Screen shot of the new interface design of* the *Accelerator Electronic Maintenance Request and Tracking form.*

New interface design. A new interface design incorporates HTML "frame" objects that keep navigation choices visible in the left margin of the browser window as users proceed through the process of requesting and reporting maintenance (Fig. 1).

Periodic maintenance requests. Users can now request that maintenance be performed on a regular schedule. This feature makes it easy for a maintenance team to document its preventive maintenance program. LANSCE calibration coordinators can also use this feature to inform equipment owners of the need for calibrations. The

database stores the request for periodic mainte nance until the scheduled due date approaches and then automatically notifies the responsible team by e-mail that they have a periodic mainte nance task to perform. Once a completion date for a periodic maintenance task is entered into the database, a new due date is calculated based on the required maintenance frequency, and the clock starts ticking again.

Deferred maintenance. Occasionally the comple tion of a maintenance request must be deferred because of a funding, resource availability, time, or other constraint. Previously the only options were to hold the request open and have it appear as an unresolved item or delete it from the data base and lose track of the request. Maintenance requests may now be deferred by choosing one of four possible reasons for deferring a request and entering a date by which the decision to defer the request will be reviewed. Group management will use this feature as a management tool for deter mining resource requirements and for requesting additional funds to deal with the maintenance backlog.

Requesting a specific completion date. As an alternative to assigning a priority to a request and having the responsible personnel schedule the work accordingly, users now have the option of requesting a specific completion date.

Data downloads. Results of a general search of the database can now be downloaded to the user's desktop computer in an HTML file that can be opened by Excel 97/98®. This new capability allows team leaders and group leaders to down load relevant records and perform functions such as sort, filter, and subtotal to extract information from the database. Almost all externally available database fields are included in the downloaded file.

System Usage

In the nineteen months before the introduction of Version 2.0, 586 maintenance tasks were entered into the database. During FY99, an additional 690 tasks were recorded. Of the 586 items recorded before October 1, 1998, only 44 were reports of maintenance performed without an on-line request. Of the tasks entered during FY99, 410 were requests (280 of which had been responded to by December 1, 1999), and 280 were reports of maintenance performed without an on-line request. A report containing other FY99 maintenance statistics is available on the LANL internal Web at
http://aot6-server.lcs.lanl.gov/maintenance/fy99report.pdf

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